



Advanced Safety Technology in Asset Integrity

24th Feb'26

Disclaimer



Any statement, opinion, prediction, comment, or observation made in this presentation/publication are those of the presenter/author only and in no condition should be construed necessarily representing the policy and intent of Reliance Industries Ltd. (RIL).

The information presented herein are of the presenter/author's own and in no way RIL attracts any liability for any inconsistency or irregularity in terms of the accuracy completeness, veracity, or truth of the content of the presentation/publication. In addition, RIL shall not be liable for any copyright infringement and misrepresentation for the presented content as the content is presumed in good faith to be a creation of presenter's/author's own mind.

The scope of this presentation/publication is strictly for knowledge sharing purposes and not necessarily to provide any advice or recommendation to the audience/readers. Any endorsement, recommendation, suggestion, or advice made by the presenter/author shall be in his personal capacity and not in professional capacity as an employee of RIL. Any person acting on such endorsement, recommendation, suggestion, or advice will himself/herself be responsible for any injury/damage.

Introduction To Reliance



 A Fortune Global 500 Company and India's Largest and Most Valuable Corporate

Market Capitalization

~US\$ 210 Bn¹

Net-worth

US\$ 117 Bn

Revenue

~US\$ 125 Bn

EBITDA

US\$ 21 Bn+



Unprecedented
shareholder value
creation

Market Cap CAGR
~30% since IPO



Leading India's
capital formation

Investments over the
past 3 years
US\$ 65.5 billion



Transition from B2B
to B2C in last 10 years

Leading consumer
platforms
Telecom, Retail, Media,
Financial services



Top-tier credit ratings

Rated above India's
Sovereign Credit Rating
1 notch above
sovereign by both
S&P & Moody's

India's most reputed and trusted Company

¹ Market Cap as on 31st Aug 2025

RIL: Portfolio of Diversified and Multi-Decadal Growth Opportunity Businesses



Digital Services

- India's largest deep-tech digital services company
- World's highest data traffic; 500mn+ subs, 220mn+ 5G users; 20mn+ home connects
- Growing digital platforms

Retail

- Multi-category, multi-format, and omni-channel business model
- Registered customer base of close to 360mn
- Broad based growth

FMCG

- India's fastest growing FMCG company, at scale; Rs 11,500 crore FY25 revenue; growing 2x YoY
- Leadership in different categories

Media

- 2nd largest OTT platform globally
- Averaged 460mn+ MAUs (1QFY26)
- 300 mn paid subscribers
- 3.2 lakh hrs of content

Hydrocarbons Businesses

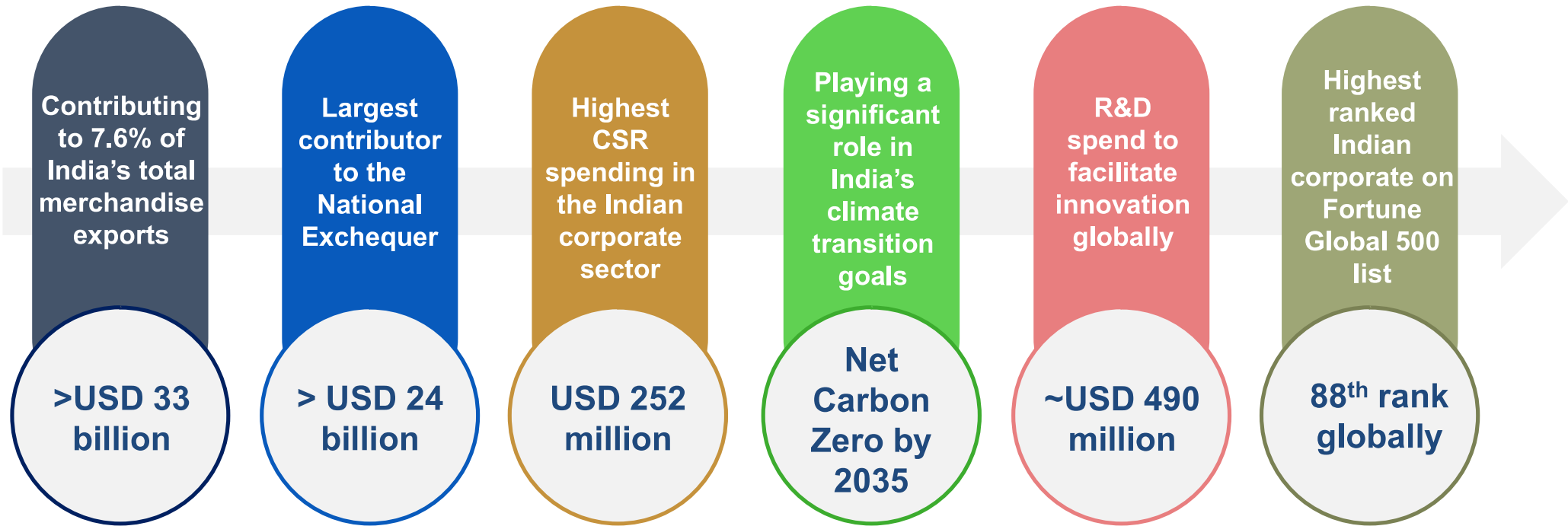
- Global leader in O2C operations, delivering high-spec fuels and materials
- Focus on competitive feedstock sourcing and capture value chain margins
- Operational excellence evident in 100% capacity utilization
- Strong growth in domestic fuel placement through Jio-bp
- Deep-tech capabilities in upstream has set new benchmarks in India's E&P

New Energy

- On-track to commission giga-factories progressively over next 4-6 quarters
- Post-commissioning, business to be self-funded by partnering with right players for offtake and financing



Pre-eminent Position In India



Maintained leadership position among Indian corporates for nearly three decades

Note: FY25 Data, US\$1= INR 85.475



All-round Approach To Sustainable Growth

1 **Circularity**
>23k MT plastics recycled*
Developing innovative solutions like Waste-to-Road and Waste-to-Oil

2 **Inclusivity**
1.9L New Hires*
Contributing significantly to employment creation in the economy

3 **Innovation**
1,156 patents
Advancing sustainable solutions through research and innovation



4 **Governance**
Dedicated ESG Committee
Board oversight of the company's ESG proposition

5 **Regeneration**
2.48Cr saplings planted
Preserving biodiversity and having a net positive effect on environment

6 **Health & Safety**
ISO 45001 & OSHAS 18001
Adherence to highest levels of globally recognized safety standards

Focus on embedding sustainable practices in all business operations

FY25 data *During FY25



O2C Business: World Class Assets of Global Scale...



1.4MMBPD Crude Refining Capacity
Largest single site refinery complex globally



71.2 MMT Production meant for Sale
80.5 MMT Throughput | **72.2 MMT** Crude processed



1,991 Fuel Retail Outlets | **6,292** EV Charging Points
in 51:49 JV with BP



Among Top 5 | Largest Global Producers of PTA, PP
3rd | Largest Producer of PX Globally



21.1
Complexity Index¹



100 sites
Retailing Bio-CNG manufactured at RIL's digestors



1.5%
of Global Crude processed at Jamnagar Complex



14
Manufacturing facilities in India (11) and Malaysia (3)

Pioneered vertical integration and conceived oil-to-chemicals concept well ahead of industry

• Note: 1 As per KBC study for Jamnagar Supersite Complex



...Generating Significant Benefits Through Deep Integration

Jamnagar Supersite

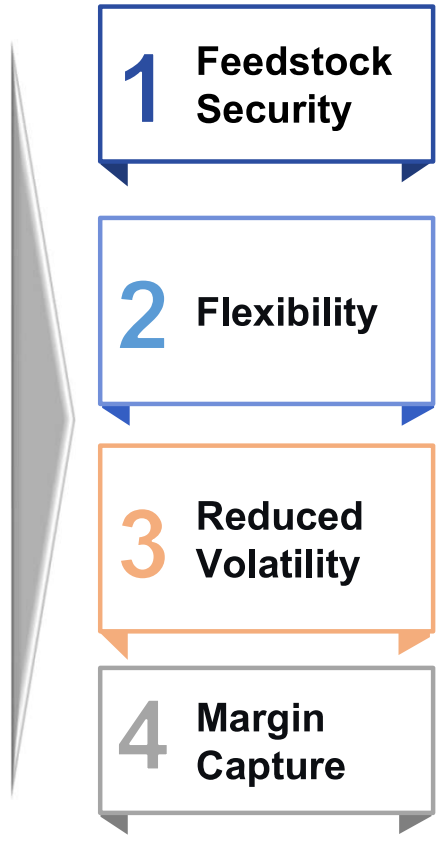
- World's **largest and most integrated O2C Complex**
- **World's largest ROGC**, with downstream LLDPE, LDPE, MEG plants
- **Top decile refinery performance** and **top quartile cracker costs**
- Largest **single location PX facility worldwide**

Manufacturing Sites

- **Cracker integrated** sites at Hazira, Dahej, Nagothane and Vadodara
- Value add from **integrated Polyester / Polymer / Elastomer value chains**
- Strategic location and dedicated infrastructure for **logistics cost advantage**

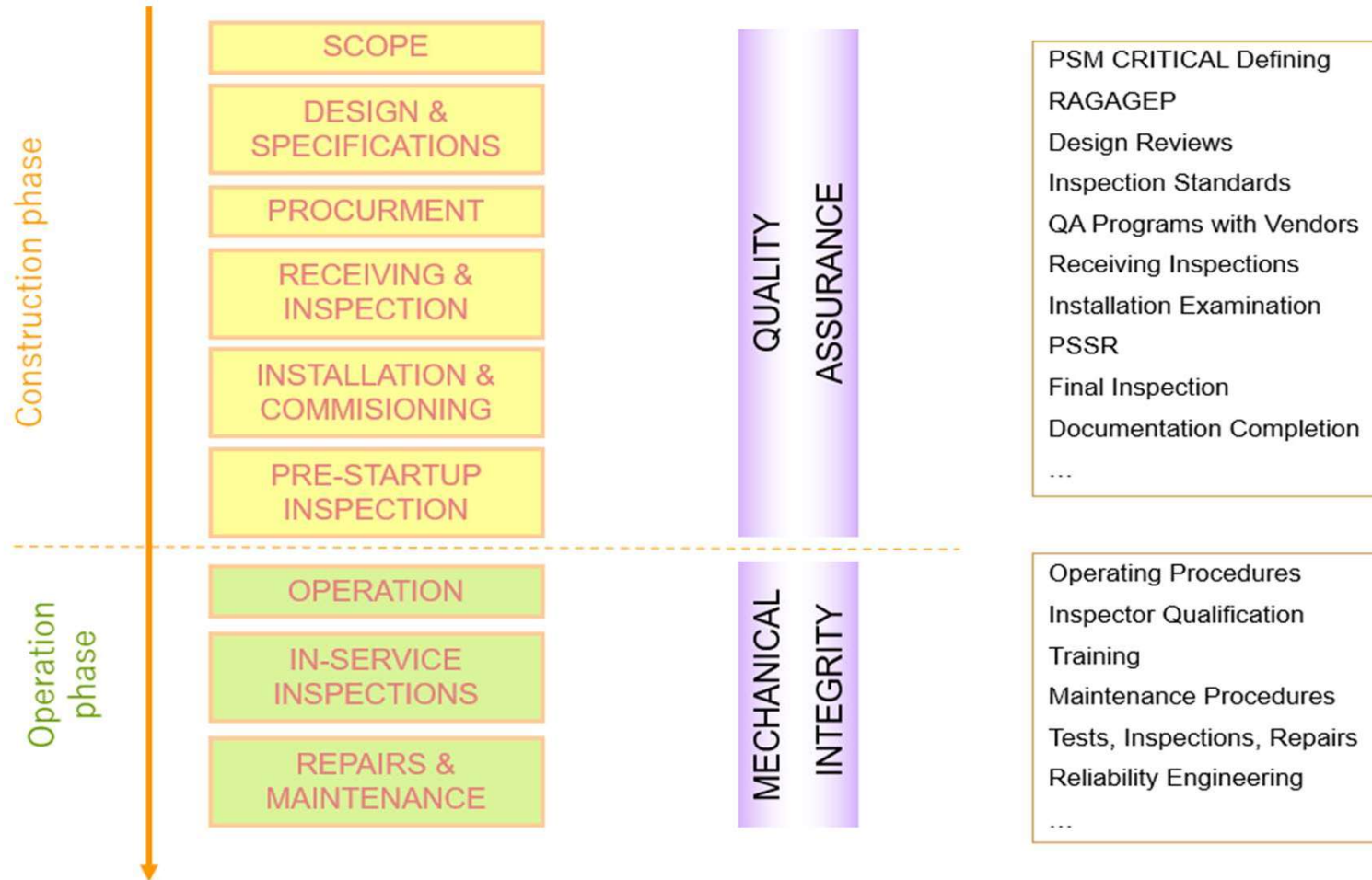
Ethane Imports

- **Virtual pipeline** for import of Ethane from surplus US markets to RIL crackers



RIL is best positioned globally to sustain growth and profitability over industry cycles

LIFE CYCLE Concept for PSM Critical Assets



Why Inspect ?



- **Safety**
- Regulatory requirements
- Reliability and Efficient Operation
- To identify deterioration mechanisms
- To specify repair, replacement, future inspections.



Conventional Inspection Management

VISUAL INSPECTION
ACCOMPANIED BY BASICS NDES

DP, UT, RT, MPI, HARDNESS,
VISUAL





High demand on Safety
Zero Failures



EED (Early Event Detection)



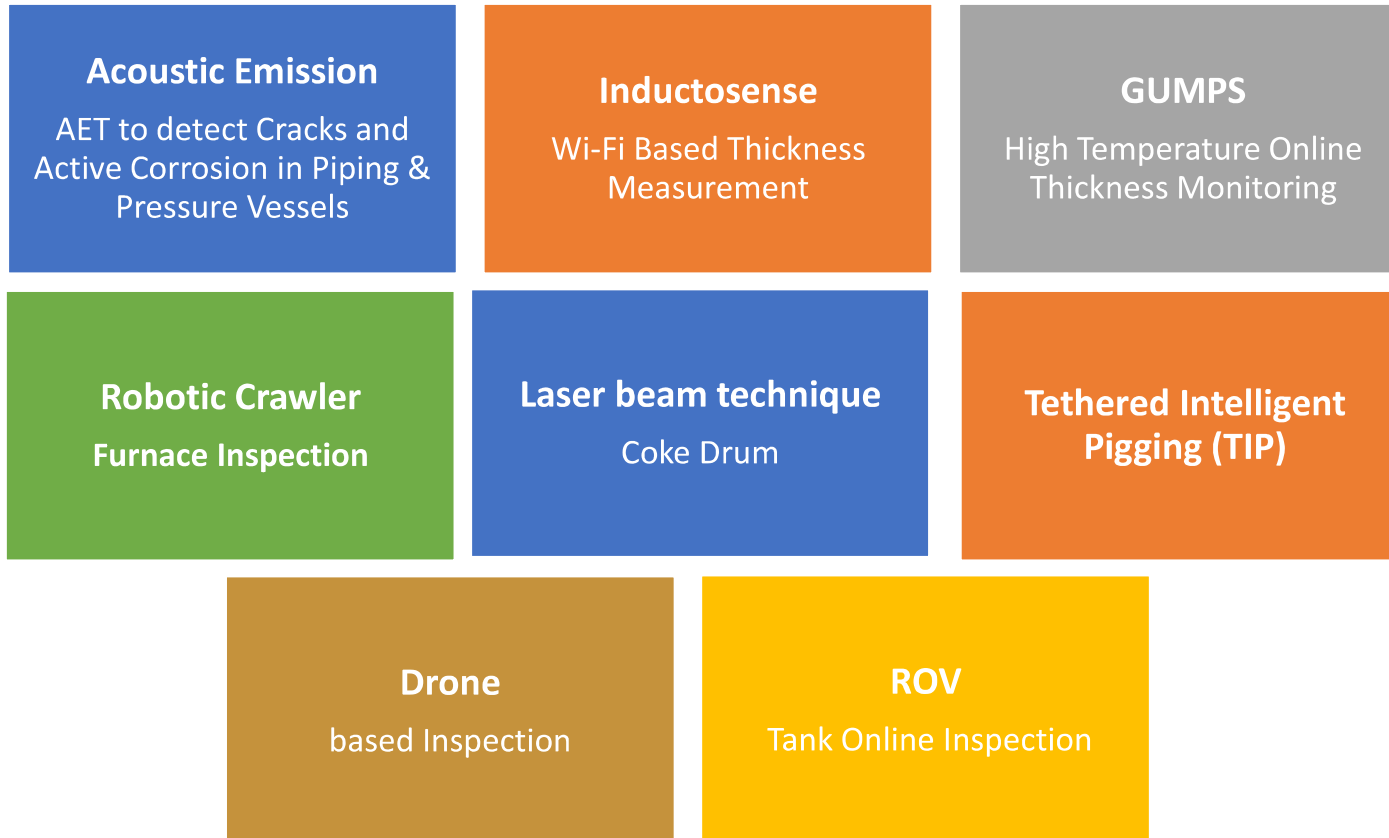
Assets



High temperature

- **Modern Day Challenges**

Advanced NDTs implemented in RIL



Inductosense “Wireless Thickness Measurement”



Inductosense Wireless Thickness Measurement

Challenge

- Online Corrosion monitoring

- Frequent TML monitoring
- Huge scaffold requirements

TMS Sensors

- Permanently installed sensors on the surface of pipework and vessels.
- 200 sensors installed at site.

- Noncontact thickness measurement
- Equipment → WAND and TMS sensors
- IDM Software - Software for remote management of the data

Benefits

- Elimination of
 - coating removal for thickness measurement.
 - Insulation removal
 - scaffolding for upto 4m height

- Reduced Maintenance and inspection efforts.
- Trending of thickness values and better repeatability of measurement locations.
- High Productivity



TMS Sensors

Ultrasonic thickness sensors



WAND

Handheld measurement tool



IDM Software

Data management software



Image source –Inductosense

© Reliance Industries Ltd., 2025

GUMPS



GUMPS GUIDED ULTRASONIC MONITORING OF PIPING

Challenge

- Corrosion monitoring in complex processes and gigantic equipment.
- Demand for continuous monitoring of critical Inspection areas.
- Rigorous inspection schedules.
- High frequency of monitoring
- High Manual intervention

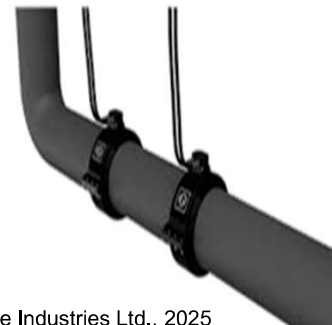
GUMPS

- Online Corrosion Monitoring System for High Temperature Pipelines upto temperatures of 200 deg C
- Reduced Manual intervention.
- Automated data recording.

Benefits

- Live Corrosion Rates on Screen.
- Immediate identification of Corroded area with area loss analysis and defect map
- Fully automated analysis on long range ultrasonic testing (LRUT)
- Automated daily reports through email to all respective stakeholder

- Online Corrosion Monitoring System for High Temperature Pipelines. Can work upto temperatures of 200 deg C presently
- Live Corrosion Rates can be seen on Screen
- Immediate identification of Corrosion
- Developments for GUMPS upto 280 deg c in progress



AET for Pressure Vessels & Piping to detect Cracks



AET Acoustic Emission Testing

Challenge

- Detection of Cracks in weld joints.
- Inspection of long length pipe lines.
- High Manual intervention
- Breakdown causing production loss.

AET

- Sensor, preamplifier, filter, and amplifier, along with measurement, display, and storage equipment.
- Monitor for crack detection in pressure equipment

Benefits

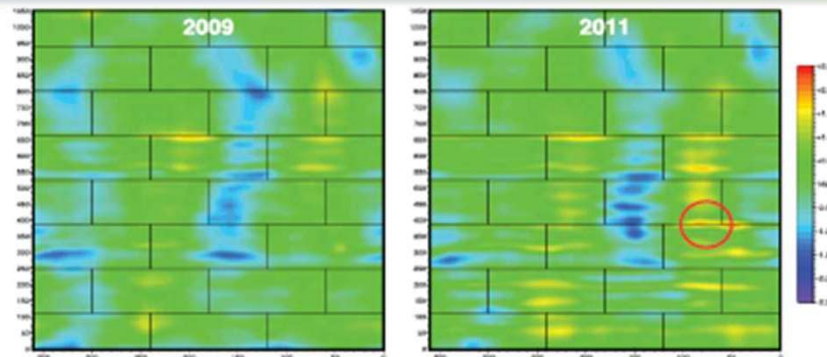
- Inspection tool to screen the active corrosion or damages.
- Followed up NDT at identified locations for characterization of defects
- Using AET in service system like pipe and tank can deliver a good result to ensure the integrity of the piping/equipment



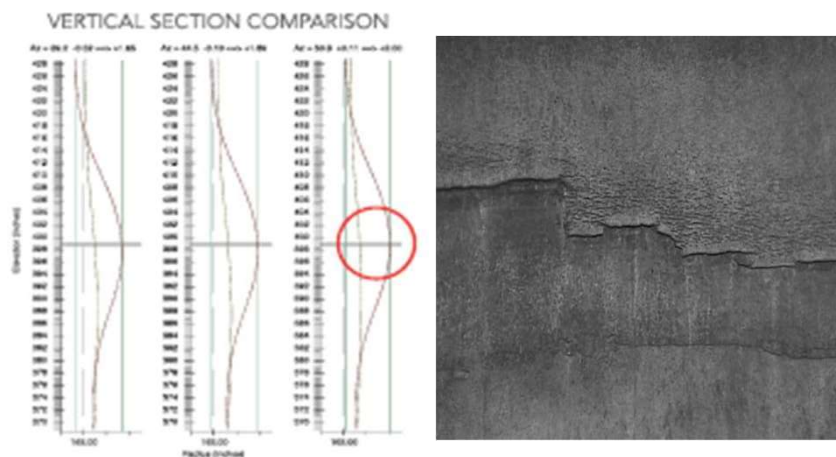
Laser Beam Technique for Coke Drum



Drum Image or Bulge Maps



Vertical Section

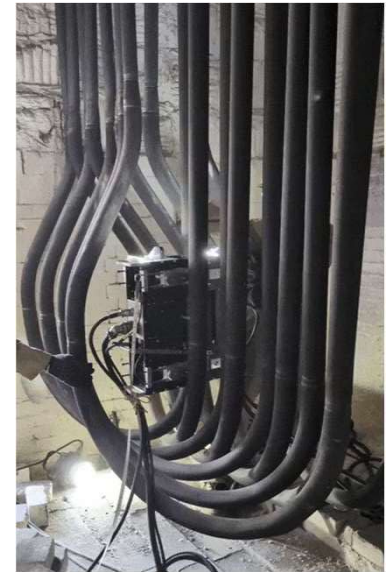


The section view, and bulge map indicate a sharp distortion at the circumferential weld and the visual inspection photo confirms the presence of a crack type indication in the same region. With this correlation technique, to make accurate determinations on drum condition.

Furnace Inspection: Robotic Crawler based



- Comprehensive assessment of radiant coils
 - Carburization detection (via the TFET technique), bulging, bowing, and visual assessment.
 - 100% coverage of radiant coils
-
- **Key benefits**
 - **Better decision** with more insights on condition of tubes by utilizing data obtained from 100% coil length scanning vs. conventional handheld spot measurement meters.
 - **Reduced furnace downtime** by 5 working shifts by minimizing scaffolding erection and inspection time.
 - **Improved safety** by minimizing work at height and confined space exposure.
 - Allows for **strategic reassessment of coil revamping** without compromising reliability, and aligning with asset integrity assurance.



Radiant Coil Inspection

Furnace Inspection: Convection Coil Inspection Tethered Pigging using TFET Probe



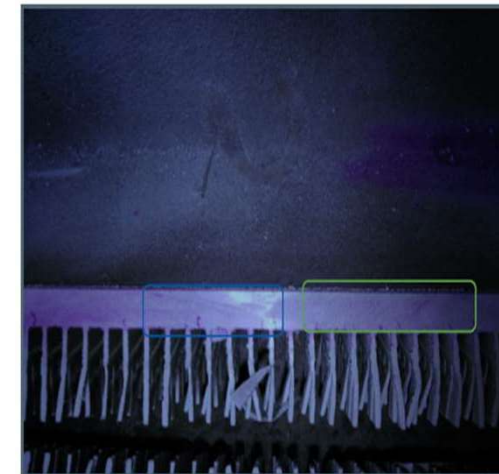
Furnace Convection Coils Health assessment – Shift in Approach

Historical Approach:

- Unknown vulnerability & surprise failure results in Production Loss
- No inspection technique available to detect cracks in coils, hence conservative decision making of 100% replacement

Approach Going Forward:

- Known vulnerability with understanding on coils condition
- A Step forward towards Improved prioritized decision making approach for replacement with pros & cons using inspection data



Cracks post splitting tube

Key Benefits

- **Enhanced Inspection Confidence:** Early detection technique of both external cracking and internal corrosion.
- **Informed Asset Planning:** Enables data-driven decisions for coil procurement and retubing strategies, moving away from reactive replacements based on failures.
- **Reduced Unplanned Downtime:** Proactive assessment approach minimizes unexpected furnace outages, improving operational uptime.
- **Improved Safety and Reliability:** Strengthens the integrity of furnace coils, contributing to safer and more reliable furnace operation.

Image source –NDTT,RIL

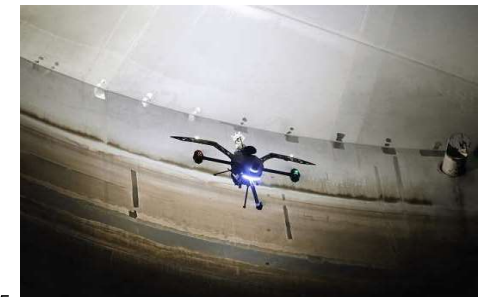
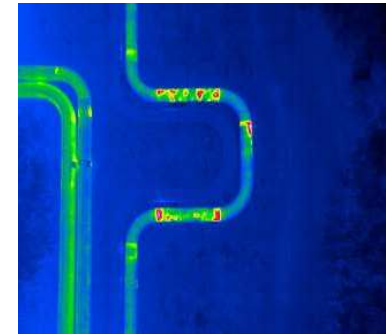
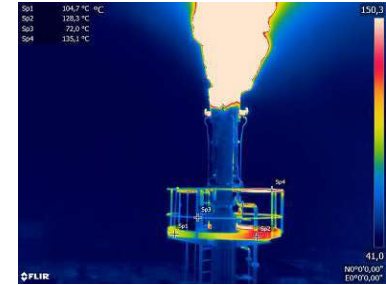
© Reliance Industries Ltd., 2025

DRONE Based Inspection

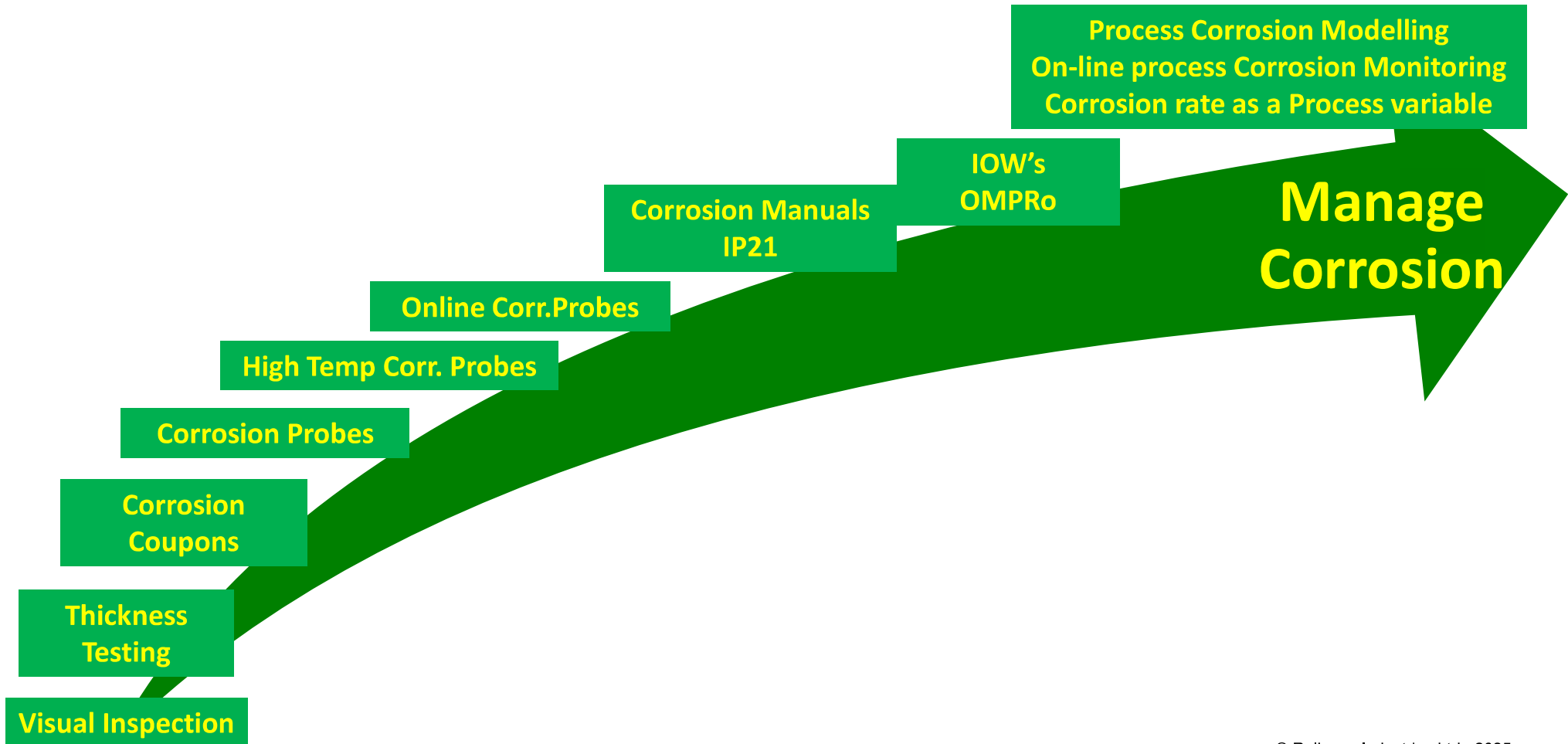


Key Benefits

- Inspection of hard-to-reach areas
- Flare stack inspection
- Pipeline surveillance.
- Inspection in confined space
- Visual Inspection
- Thermal imaging for hot spot identification
- **Improves safety** by reducing the need for personnel to enter hazardous or elevated areas.
- **Speeds up inspections**, enabling quicker assessment and decision-making.
- **Enhances asset reliability** through more frequent and precise condition monitoring. Minimizes downtime by enabling faster detection of issues.
- Supports compliance with stringent industry regulations through accurate data collection.
- Provides precise, real-time data essential for proactive maintenance and operational efficiency.
- **Cost effective solution** reduces cost associated with traditional inspection methods and equipment.



Manage Corrosion



Rover based Storage Tanks Inspection



Tank shutdown
(Operation dependent)

Ageing Asset
(Process Safety Risk and Business risk)

Confined space entry

Extended outage timeline for M&I activities

Challenges



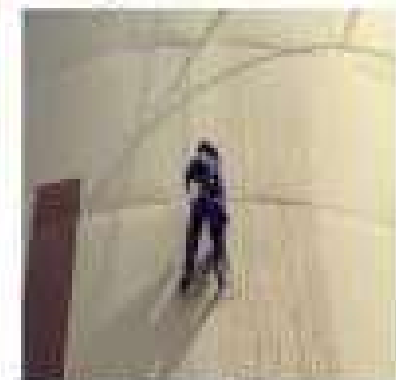
Oil Leak - Tank bottom Failure



Confined Space - Hazardous, Costly, Damage & Slow



Oil Tank Cleaning - Hazardous, Costly, Damage & Slow



Manual Inspection - Risky, Hazardous, costly, Slow

Why Rover Based inspection?



Online Tank Inspection

- Fast Inspections, no need to prepare for Internal Inspection
- Eliminates human entry into hazardous tanks
 - Reduces shutdown time
 - Provides high-resolution visual data
 - Enhances safety compliance
- Better preparation for repairs based on assessment of internal condition.
- Increase in Inspection confidence and Reliability

Benefits –

- Substitute/deferment Internal inspection requirement for clean service .



Online Robotic Tank Inspection – By Petrobot / T.S. Bhatnagar



Tank online inspection in Water and HC tanks



Where It Is Used

- Water Tanks, DM water tanks
- Diesel storage tanks
- Hydrocarbon tanks

Online assessment of HC tank using Rover-

- Rover was calibrated in artificially created defect plate.
- ROVER was ATEX compliant, PESO approved and hydraulically operated (to avoid fire hazard/explosion)
- Tank Dimension- **20M Dia X 20M Height, Single line in operation.**
- During assessment Rover covered ~2.0 KM on bottom plate and taken thickness readings with an interval of 2 mm.
- Internal roof visual assessment through intrinsically safe camera was carried out.
- Shell external/internal(bottom plate) assessment was performed within 4 days only.





Tank Assessment Dashboard



Underwater Visual Inspection Report for Survey Carried out by Planys Technologies Pvt.

PLANYS Reliance Industries Limited Inspection Report Dashboard



Underwater Visual Inspection Report for Survey Carried out by Planys Technologies Pvt.

Image source –Planys, RIL dashboard

Tank Assessment Dashboard



PLAYNS Home Inspection Image Inspection Map Observations Inspection Data Conclusions

TANK SHELL

DIW WATER TANK 1151C SHELL

TANK BOTTOM PLATE

DIW WATER TANK 1151C BOTTOM PLATE

TANK ROOF

DIW WATER TANK 1151C ROOF PLATE



Thank You